REMARKS

The present response requests reconsideration of the rejected claims.

In the Office Action, claims 1,2,7, 13, 14, 19-21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ueda (JP 1992-363301) and Blixtt et al (U.S. Patent No. 4,964,915). Claims 3, 4-6, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda and Blixtt in view of Savina (U.S. Patent No. 3,223,544). Claims 8, 9-12, and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda and Blixtt and further in view of Persson et al (WO 9955964).

In the present invention, the main objective is to improve sizing of cellulosic furnishes having high conductivities. The sizing efficiency of conventional sizing dispersions decreases as the conductivity of the furnish increases. Therefore, an increased amount of sizing agent must be added in order to retain the sizing level of high conductivity furnishes compared to standard furnishes. Inevitably, the costs associated to the sizing agent will increase. In addition, the amount of sizing agent in the white water will increase when sizing high conductivity furnishes with conventional sizing dispersions and this will eventually have a negative impact in the paper-making process.

It was surprisingly found in the present invention that a sizing dispersion comprising a sizing agent and aromatic starch containing less than 95 wt% amylopectin and condensed sulfonate significantly improves sizing of high conductivity furnishes compared to conventional sizing dispersions.

Example 1 and 2 in the application clearly demonstrate the positive impact on sizing efficiency of the sizing dispersions according to the present invention. In example

1 and 2, the same sizing dispersion of the invention was used containing cationic aromatic starch and condensed naphthalene sulfonate, however, the conductivity of the furnish in example 2 was 5000 μS/cm compared to a conductivity of 500 μS/cm.

If conventional sizing dispersions are applied on furnishes having a conductivity of 5000 μS/cm sizing efficiency would be seriously hampered. This fact is convincingly shown in example 3 and 4 of the application. The addition of a prior art sizing dispersion to a high conductivity furnish (5000 μS/cm) significantly decreased the sizing efficiency compared to the addition of the same amount of sizing agent to a normal conductivity furnish (500 μS/cm). The addition of 0.122 kg/t sizing agent to a furnish having a conductivity furnish of 500 μS/cm rendered a $cobb_{60}$ value of 42, whereas the same amount of added sizing agent to a furnish having a conductivity furnish of 5000 μS/cm gave a $cobb_{60}$ value of the obtained paper of 95.

However, a high conductivity furnish had no negative effect at all on sizing performance of the sizing dispersions according to the present invention. Even if the conductivity was raised 10-fold (from 500 to 5000 μS/cm) the sizing dispersion according to the invention gave equally good sizing results, namely a $cobb_{60}$ value of 25.

It is believed that there exists a synergy effect between the aromatic starch containing less than 95 wt% amylopectin and the condensed sulfonate.

According to the Office Action, Ueda is believed to constitute the closest prior art document and is combined with Blixt or Blixt and Savina or Blixt and Persson. Ueda discloses the use of aromatic substituted starches having less than 95 wt% of amylopectin in sizing dispersions. Furthermore, surfactants, such as sodium lignin sulfonate or polyoxyethylene lauric acid amide, can be used; yet, Ueda is silent about the use of condensed sulfonates. Consequently, the claimed invention is novel over Ueda.

With regard to Savina, one skilled in the art and trying to solve the problem of sizing high conductivitiy furnishes would not be motivated to combine Ueda with Savina. Savina does not mention the main problem of the present invention, namely sizing of high conductivity furnishes. In fact, Savina does not relate to improving sizing at all, but solely to the suppression of the development of ketene dimer aggregates during the formation of the dispersion. The solution to the problem of development of aggregates is a process for manufacturing a dispersion comprising using a water-soluble cationic starch and an anionic material selected from lignosulfonate and naphthalene sulfonate. Aromatic substituted starches containing less than 95 wt% amylopectin are not even mentioned, let alone the specific combination of aromatic starches with condensed naphthalene sulfonate. Hence, to arrive at a solution falling within the terms of the claims is based on Ueda and Savina requires hindsight from the present invention.

Although one objective mentioned by Blixt is to find sizing dispersions that further improve sizing of paper, the improvement of high conductivity furnishes is not addressed by Blixt. The invention of Blixt is to provide a sizing composition comprising a cationic starch having a highly branched, high molecular weight structure, indicated by a amylopectin content of over 85% most preferably about 99%. However, Blixt does not mention aromatic substituted and specifically not the combination aromatic starch containing less than 95 wt% amylopectin and condensed sulfonate. What is more, Blixt stresses that the content of amylopectin of the starch should be as high as possible, most preferably about 95-100 %. Thus, with respect to the amylopectin content of the starch, Blixt clearly teaches away from the present invention. Therefore, a combination of Ueda with Blixt would also not be plausible for the skilled person.

Additionally, Persson does not refer to sizing dispersion at all, but only a novel process for the production of paper involving a specific drainage and retention aid. The fact that sizing agents can also be added to the paper-making process is only

mentioned in passing, hence, the type of sizing dispersions are not mentioned at all. Thus, Persson does not appear relevant to the claimed invention at all.

For the reasons set forth above, the present invention is both novel and non-obvious with regard to the cited references.

The Applicants respectfully request that the Examiner reconsider the rejection of claims 1-26 and find the claims in condition for immediate allowance.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that a call may be deemed desirable by the Examiner:

Michelle J. Burke (914) 674-5459

Respectfully submitted,

Michelle J. Burke
Reg. No. 37,791
Attorney for Applicant

Akzo Nobel Inc.
Intellectual Property Dept.
7 Livingstone Avenue
Dobbs Ferry, NY 10522-3408